

SEP 29 1982

MEMORANDUM FOR: Darrell G. Eisenhut, NRR  
Edward L. Jordan, IE  
Richard E. Cunningham, NMSS  
Robert M. Bernero, RES  
Clemens J. Heltemes, Jr., AEOD  
Joseph Scinto, ELD

FROM: Victor Stello, Jr., Chairman  
Committee to Review Generic Requirements

SUBJECT: CONTINUATION OF CRGR MEETING NUMBER 20

The Committee to Review Generic Requirements (CRGR) will meet on Wednesday, September 29, 1982 in Room 6507 MNBB from 12-2p.m., to continue CRGR Meeting #20 held on September 21, 1982.

At the September 21 meeting, IE briefed the Committee concerning the background, proposed actions and rough cost estimates associated with resolution of the BWR pipe cracking issue. IE indicated that a bulletin would be prepared and requested that the subject meeting be held to review the bulletin. Since the bulletin is currently unavailable for review, I have enclosed the IE presentation from the last CRGR meeting.

Persons making presentations to the CRGR are responsible for (1) assuring that the information required for CRGR review is provided to the Committee (CRGR Charter - IV.B), (2) coordinating and presenting views of other offices, (3) as appropriate, assuring that other offices are represented during the presentation, and (4) assuring that agenda modifications are coordinated with the CRGR contact (Walt Schwink, x24342) and others involved with the presentation. With regard to attendance at CRGR meetings, I request that Office Directors limit attendance of their staffs at CRGR meetings to those few senior staff needed to address the agenda item under discussion. As a minimum, Division Directors or higher management should attend meetings addressing agenda items under their purview.

Original signed by  
Thomas E. Murley

*TS*  
Victor Stello, Jr., Chairman  
Committee to Review Generic Requirements

Enclosure: As stated

cc: w/o encl.:  
Commission (5)  
W. J. Dircks, EDO  
Office Directors  
Regional Administrators  
G. Cunningham, ELD

DISTRIBUTION  
VStello  
TEMurley  
DEDROGR staff  
DEDROGR cf  
PDR (mg/cgr)  
Central File

*R 001*

OFC	:DEDROGR	:DEDROGR	:DEDROGR	:	:	:
NAME	:WSchwink	:TEMurley	:VStello	:	:	:
DATE	:9/22/82	:9/24/82	:9/24/82	:	:	:

BACKGROUND

PIPE STUDY GROUP

NINE MILE POINT

PROPOSED ACTION ITEMS

IMPACT

MAN-REM

COST

BACKGROUND

- o FURNACE SENSITIZED SAFE ENDS LEAKED DURING HYDRO IN MARCH 1982
  - NO CRACKS FOUND IN UT EXAM 9 MONTHS EARLIER
  - IGSCC CONFIRMED
  - BEING REPLACED
  
- o INSPECTION OF PUMP ELBOW FOLLOWED - IGSCC CONFIRMED
  
- o INSPECTION EXTENDED TO 28 INCH DIAMETER RECIRC PIPE
  - ~40% OF WELDS INSPECTED BY UT
  - ~ALL HAVE UT INDICATIONS
  - REPORTED TO NRC 8/82
  - BEING REPLACED

### NAMP-1 UT TECHNIQUE EVOLUTION

<u>ITEM</u>	<u>1975 TO 1980</u>	<u>1981</u>	<u>1982</u>	<u>COMMENT</u>
CALIBRATION STANDARD	1.5" THICK FLAT PLATE	—————→		ACTUAL CURVED PIPE OPTIMUM
CALIBRATION REFLECTOR	1/8 SIDE DRILL HOLE OR 10% NOTCH	10% NOTCH	10% NOTCH	
SENSITIVITY	+6DB	+6DB TO 10DB	6DB/+20DB	} SEPARATES CRACKS FROM GEOMETRIC REFLECTORS
X SECT PLOTS	NO	SOME	EXTENSIVE	
ANGLED SCANS	NO	YES	YES	} FOCUSED FOR 1.1 INCH WALL BUT CALIBRATED ON 1.5 INCH BLOCK
FREQUENCY	2.25 MHz	1.5, 1.6, 2.25 MHz	1.5 MHz	
PITCH/CATCH TRANSDUCER (EPRI)	NO	YES	YES	
EST. HIGH CONFIDENCE DETECTION LIMIT	--	--	5% WALL, >1" LONG	

SENSITIVITY HAS EVOLVED/IMPROVED  
MORE RELIABLE NOW THAN EARLIER

NMP-1 ULTRASONIC EXAM HISTORY

- o 31 PIPE FITTING WELDS UT INSPECTED IN 1982
- o 25 OF THE 31 HAD NO PRIOR EXAM
- o 2 OF THE 31 EXAMINED IN BOTH 1981 AND 1982
  - NO REPORTABLE INDICATIONS IN 1981
  - ESTIMATED  $\sim$ .05" AND .07" DEEP IN 1982  
JUST ABOVE RESOLUTION LIMIT
- o 4 OF THE 31 EXAMINED ONCE BETWEEN 1977 TO 1980 AND AGAIN  
IN 1982

OVER TIME, UT TECHNIQUES HAVE EVOLVED  
TOWARD GREATER SENSITIVITY AND RELIABILITY

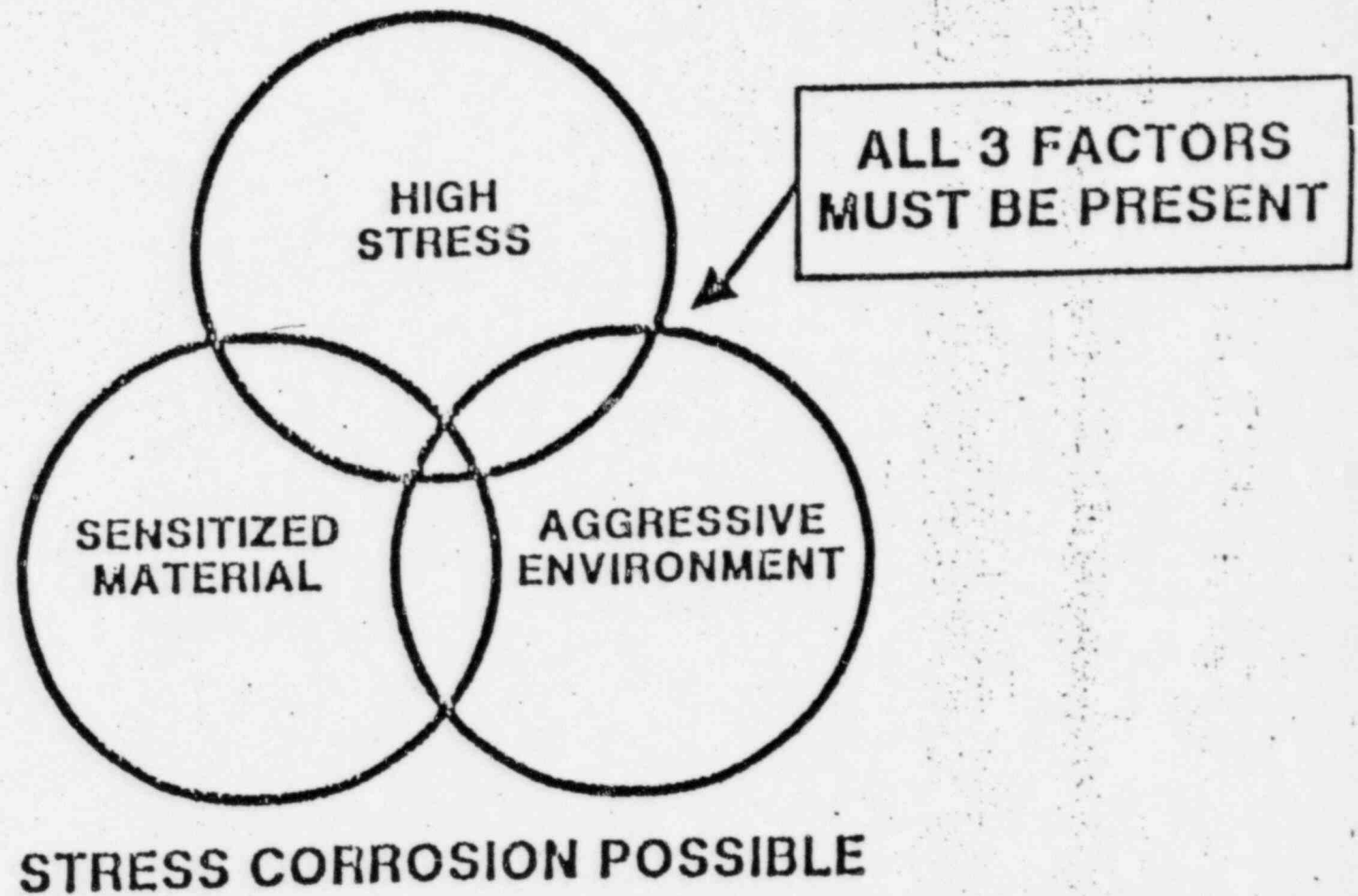
VERY LIMITED REPEAT UT DATA

POTENTIAL NMP-1 UNIQUE CONTRIBUTIONS

	<u>PRESENT AT NINE MILE PT-1</u>	<u>PROBABLE IGSCC CAUSE</u>
PIPE FABRICATION (E.G. RESULTING IN FURNACE SENSITIZATION)	NO	NO
WATER CHEMISTRY (TRANSIENTS, HIGH CONDUCTIVITY)	NO	NO
UNUSUAL HIGH STRESS (E.G. CODE, SUPPORTS, FABRICATION)	POSSIBLY	POSSIBLE
UNIQUE OPERATION CONDITIONS (I.E., PLANT RUN WITH SOME LOOPS VALVED OUT)	YES	NO
PIPE DECONTAMINATED PRIOR TO UT	YES	NO

# CONDITIONS LEADING TO STRESS CORROSION

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INSERVICE INSPECTION  
LARGE DIAMETER, THICK WALL PIPE

CARBON CONTENT

LOW  
< .035



NORMAL ISI  
PROGRAM, BUT  
INCREASED UT  
SENSITIVITY

HIGH  
> .035



AUGMENTED ISI  
PROGRAM



IF CRACKING INDICATED  
FIX  
OR  
JUSTIFY CONTINUED  
OPERATION



AUGMENTED ISI PROGRAM

INCREASED UT SENSITIVITY

EXAMINATION EACH REFUELING

WELDS WITH HIGH POTENTIAL FOR IGSCC

ALL TERMINAL ENDS

ALL WITH HIGH STRESS

ALL WITH HIGH CUMULATIVE FATIGUE

OTHER WELDS TO YIELD 25% SAMPLE

TIGHTER CONTROLS ON UNIDENTIFIED LEAKAGE AND  
LEAKAGE FROM RCS PIPING

PROBABILITY - CONFIDENCE

MAXIMUM %  
DEFECTIVE

CONFIDENCE  
(%)

SAMPLE SIZE

ZERO DEFECTS  
FOUND

ONE DEFECT  
FOUND

10

90

23

37

50

7

17

2

90

118

195

50

36

85

PROBABILITY - CONFIDENCE  
NO DEFECTS UNCOVERED

<u>NUMBER OF SAMPLES</u>	<u>MAXIMUM % DEFECTIVE</u>	<u>CONFIDENCE (%)</u>
40	1.7	50
	5	85
	10	98
20	3.5	50
	5	63
	10	87
10	7	50
	10	63

BWR-IGSCC  
BRIEF

1965

1969 - 1970\*

1974 - 1975      FIRST PIPE CRACK STUDY GROUP

1978 - 1979      SECOND PIPE CRACK STUDY GROUP

● FIRST PIPE CRACK STUDY GROUP

-- NUREG 75/067 (1975)

-- TYPES 304 AND 316 STAINLESS STEEL PIPING  
IN THE RCPB OF BWR'S IS SUSCEPTIBLE TO  
STRESS CORROSION WHICH MAY CAUSE CRACKS  
SIMILAR TO THOSE DISCOVERED IN THE  
BY-PASS LINES AND C.S. PIPING

\* NINE MILE POINT CORE SPRAY EVENT

- SECOND PIPE CRACK STUDY GROUP

- NUREG 0531 (1979)

- STUDY CONCURRED WITH PREVIOUS PCSG FINDINGS AND CITED "THERE IS LITTLE EVIDENCE TO INDICATE IGSCC WILL NOT OCCUR TO SOME DEGREE IN LARGE DIAMETER BWR STAINLESS STEEL PIPING IN THE U.S."

- NUREG 0313 REV. 1 (JULY 1980)

- RESOLUTION OF GENERIC TECHNICAL ACTIVITY A-42

- GUIDELINES FOR REDUCING IGSCC

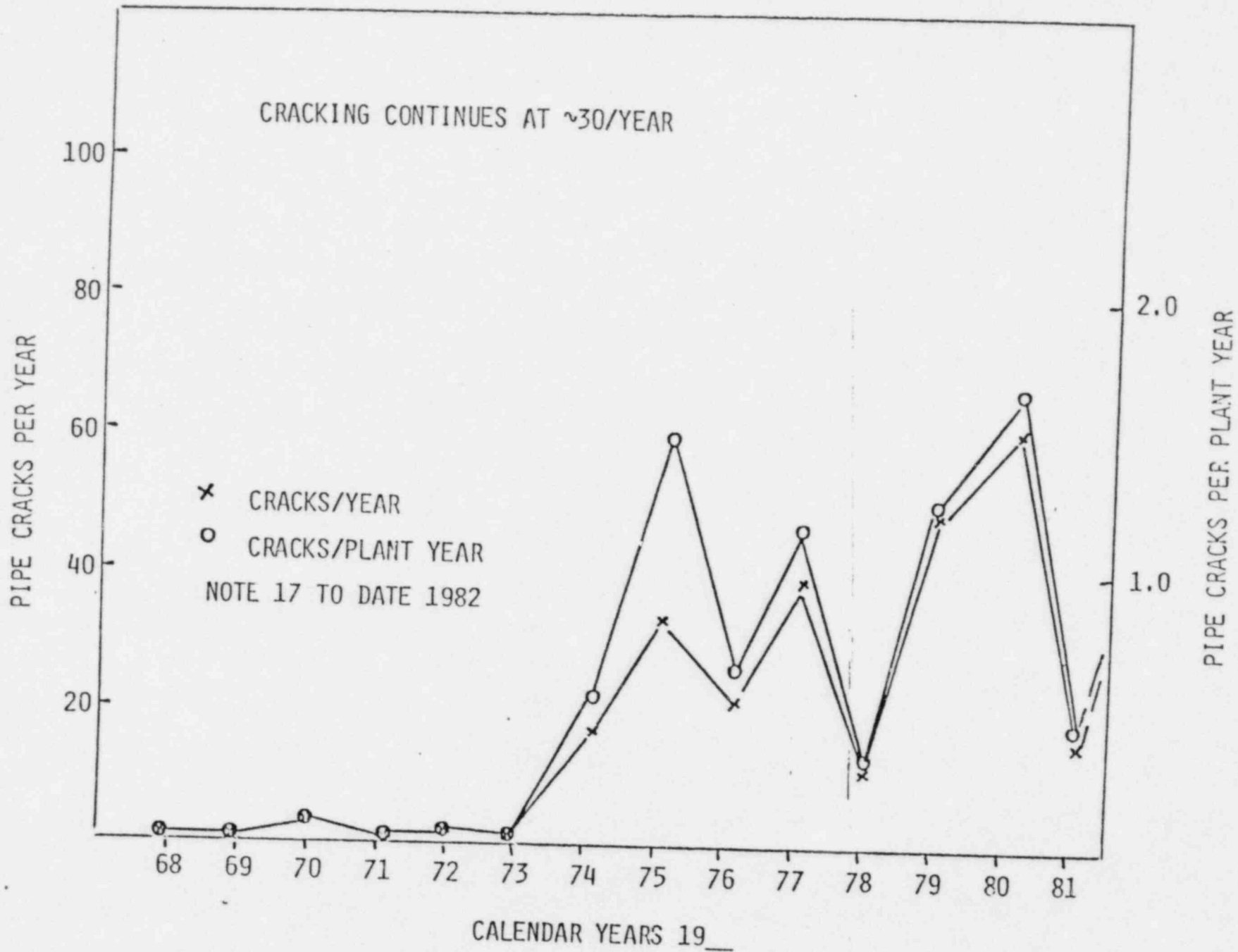
- DEFINED NONCONFORMING, SERVICE SENSITIVE LINES

- GUIDELINES FOR AUGMENTED ISI

- ISI SAMPLING SCHEMES

- NUREG 0313 REV. 1 - IMPLEMENTED BY NRC GENERIC LTR 81-04 TO LICENSEES 2-26-81

# PIPE CRACK TRENDS



Q. why didn't see earlier than 73  
A. Age of plants

IGSCC INCIDENTS BY PIPE SIZE

	<u>&lt;3"</u>	<u>4"</u>	<u>6"</u>	<u>8"</u>	<u>10"</u>	<u>12"</u>	<u>14"</u>	<u>22"</u>	<u>24"</u>	<u>28"</u>	<u>TOTAL</u>
NEDO 21000	1	29	17	9	8	0	0	0	0	0	64
SEPT. 1982	31	38	40	20	64	16	17	3	6	31	266
	32	67	57	29	72	16	17	3	6	31	330



